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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/618,632

07/15/2003

Wen-Chung Liu

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570 7590 04/24/2007
AKIN GUMP STRAUSS HAUSER & FELD L.L.P.
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2005 MARKET STREET, SUITE 2200
PHILADELPHIA, PA 19103

EXAMINER

TRAN, KHANH C

ART UNIT

PAPER NUMBER

2611

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

04/24/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/618,632

Applicant(s)

LIU ET AL.

Examiner

Khanh Tran

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 February 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-7,10,11,13-16 and 24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-7,10,11,13-16 and 24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07/15/2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The Amendment filed on 02/22/2007 has been entered. Claims 1-2, 4-7, 10-11, 13-16 and 24 are pending in this Office action.

Response to Arguments

2. Applicant's arguments, see Applicant's Remarks, filed on 02/22/2007, with respect to the rejection(s) of claim(s) 1-23 under 35 U.S.C. 102(b) and 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Eberlein et al. U.S. Patent 6,314,289 B1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-2, 4-7, 10-11, 13-16 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eberlein et al. U.S. Patent 6,314,289 B1 in view of Calderbank et al. U.S. Patent 6,115,427 (previously cited).

Regarding claim 1, Eberlein et al. transmitter / receiver concept provide the following advantages: two channels allow time and/or space diversity; the partitioner partitions rather than duplicates the output signal of the encoder into two portions of output bits; see column 6 lines 30-50.

In column 7 lines 15-35, FIG. 1 discloses an inventive apparatus for transmitting 100 and an inventive apparatus for receiving 200. The transmitting apparatus 100 comprises a bit-stream source 110, a redundancy adding encoder 120 and a partitioner 130. The encoder 120 is generally a redundancy adding encoder for generating an encoded bit-stream on its output, wherein the encoder 120 is arranged to output a code rate of $3/8$ means that for three input bits, eight output bits are produced. In column 10 lines 40-55, Eberlein et al. further discloses according to the code rate of $3/4$ (convolutional coder only), for three information bits, four channel bits are transmitted over each satellite in the system of FIG. 7. Using two satellites, eight channel bits are transmitted for three information bits.

Eberlein et al. does not explicitly teach every successive predetermined number of information bits are mapped to a first QPSK symbol and a second QPSK symbol in one symbol period in accordance with a mapping table as claimed in the application claim.

In column 7 lines 45-60, see also FIG. 1, Eberlein et al. teaches that the partitioner 130 feeds means for transmitting, i.e., a transmitter, 140 for transmitting the first portion of output bits via the first channel 300 and the second portion of output bits via the second channel 400. Both channels 300 and 400 are spatially different from

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each other. In view of the aforementioned teachings, because the output bits from the encoder 120 (for a predetermined input bits, e.g. code rate of 3/8) are partitioned into two different portions for transmitting via the first channel 300 and via the second channel 400, one of ordinary skill in the art at the time the invention was made would have recognized that each predetermined input bits are transmitted in two different channels in one symbol period as claimed.

In column 11, lines 10-20, Eberlein et al. further teaches the system where the bit-stream is de-multiplexed to two streams and transmitted using two QPSK modulators.

Eberlein et al. teaches employing two QPSK modulators, but, does not disclose a mapping unit as set forth in the application claim.

Calderbank et al. teaches a very similar transmitter comprising a source encoder 104, a channel encoder 106 and constellation mappers 108 a, b, coupled to the channel encoder 106, for mapping the first symbol of the codeword generated by the encoder 106 and the second symbol of the codeword generated by the encoder 106 in one symbol period; see column 6 lines 25-67 and see column 7 lines 10-25. Because Eberlein et al. teaches employing two QPSK modulators for modulating the transmitted signal, one of ordinary skill in the art at the time the invention was made would have been motivated to modify Eberlein et al. transmitter to further include constellation mappers as taught in Calderbank et al. invention

Regarding claim 2, as recited in claim 1 rejection and further disclosed in FIG. 1, partitioner 130 feeds means for transmitting, i.e., a transmitter, 140 for transmitting the first portion of output bits via the first channel 300 and the second portion of output bits via the second channel 400. Although FIG. 1 does not show a first and second antennas as claimed, however, one of ordinary skill in the art at the time the invention was made would have recognized that Eberlein et al. impliedly teaches employing the two antennas as claimed in the application claim.

Regarding claim 4, QPSK symbols inherently include one of four states 0, 1, 2 and 3.

Regarding claim 5, QPSK symbols inherently include one of four states 1, j, -1 and -j on the I Q plane.

Regarding claim 6, in column 8 lines 15-25, Eberlein et al. teaches a receiving apparatus 200, illustrated in FIG. 1, comprises a first receiver 240a for receiving the first portion of output bits transmitted via the first channel 300 and a second receiver 240b for receiving the second portion of output bits via the second channel 400. The output signals of the receiving means 240a and 240b are combined in a combiner 230 such that the output signals of both receivers are used in the channel decoder 220.

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Regarding claim 7, as discussed in claim 1 rejection, because Eberlein et al. teaches employing two QPSK modulators for modulating the transmitted signal, receiving apparatus 200 employs two QPSK demodulators 240d and 240e as shown in FIG. 5.

Regarding claim 10, claim is rejected on the same ground as for claim 1 because of similar scope.

Regarding claim 11, claim limitations are addressed in claim 1 rejection.

Regarding claim 13, in column 7 lines 25-35, see also FIG. 1, Eberlein et al. teaches that the encoder 120 is generally a redundancy adding encoder for generating an encoded bit-stream on its output, wherein the encoder 120 implements various code rates, e.g. $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{3}{8}$ for different plurality of information bits.

Regarding claim 14, as recited in claim 13 rejection, the encoder 120 implements various code rates, e.g. $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{3}{8}$ for different plurality of information bits.

Regarding claim 15, claim is rejected on the same ground as for claim 2 because of similar scope.

Regarding claim 16, claim is rejected on the same ground as for claim 6 because of similar scope.

Regarding claim 24, Eberlein et al. does not teach the encoder 120 being a trellis-based channel encoder as claimed in the application claim.

Calderbank et al. teaches employing a trellis-based encoder in a second embodiment as shown in FIGS. 8 and 9. AS known in the art of channel coding, trellis codes are excellent for bandwidth-constrained channels with a performance gain without expanding the signal bandwidth, therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify Eberlein et al. encoder to implement trellis-based encoder as taught in Calderbank et al. invention.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

El-Gamal et al. U.S. Patent 7,010,053 B2 discloses "Method and system for utilizing space-time and space-frequency codes for multi-input multi-output frequency selective fading channels".

Naguib U.S. Patent 6,549,585 B2 discloses "Combined interference cancellation and maximum likelihood decoding of space-time block codes".

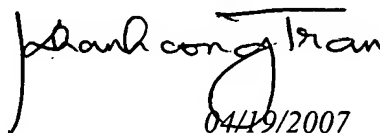
Heikkila et al. U.S. Patent 6,700,926 B1 discloses "Method and apparatus providing bit-to-symbol mapping for space-time codes".

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh Tran whose telephone number is 571-272-3007. The examiner can normally be reached on Monday - Friday from 08:00 AM - 05:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KCT


04/19/2007
Khanh Tran
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